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ORIGINAL

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Federal R & D Funding by Budget Function

Fiscal Years 1981-83

Division of Science Resources Studies
National Science Foundation

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Note: Detail in tables may not add to totals because of rounding. Percent and dollar increases and decreases in the text are also based on unrounded numbers and may not conform exactly to amounts shown in or derived from tables.

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PREFACE

This report is the only one that provides a distribution of R&D programs by the functions of the Federal budget, including all the programs and eliminating R&D plant and non-R&D activities. The sections of the report are presented in descending order of R&D budget authority for the various functions in the fiscal year 1983 budget. Each section provides a summary table with text, followed by more detailed tables for the chief R&D program areas within the function. Some 600 R&D programs are identified and their funding levels shown for the fiscal years 1981, 1982, and 1983.

Within the overall Federal budget there is no R&D budget as such nor are most appropriations for research and development so labeled except in the case of certain program areas in defense, space, energy, and environment. In order to reach an overall Federal R&D figure for analytical purposes the Office of Management and Budget (OMB) requires the agencies to submit data on their R&D programs in terms of basic research, applied research, and development, and by R&D support to universities and colleges. R&D plant data are separately given. The results of the most recent survey were published in Special Analysis K: Research and Development as one of the documents of the 1983 Federal budget. This provided a broad view of the R&D portion of the budget along with brief descriptions of the R&D programs of the larger support agencies. It did not, however, provide an array by budget functions or by detailed programs. This report attempts to answer the need for that kind of overview.

The sources of data for this report were the reports (Exhibit 44's) made by the agencies to OMB for the special analysis. In addition to these exhibits, budget justification documents of the leading R&D support agencies were also drawn upon to provide greater detail. Some information was additionally provided informally by some of the smaller agencies.

For organizational purposes the budget is divided into 17 functional areas, including interest. Funding for these functions plus allowances and undistributed offsetting receipts make up the budget total with no overlap occurring between functions or the agency programs within the functions. An immediate comparison is thus obtainable of the relative emphasis given to various areas of Federal responsibility. By categorizing R&D program data by these same budget functions the ratio of R&D funding to total Federal funding within each function can be viewed as one measure of the role assigned to research and development in meeting the needs embodied in the functions.

By another comparison, the amounts of R&D funding by functions, shown together, provide a measure of relative R&D emphases and an indication of the kinds of resources within the "R&D producing" sectors of the economy that are likely to be called upon.

Function categories and definitions used in this report are the same as those used in the budget, with one exception. The budget function of general science, space, and technology has been divided into two functions: Space research and technology and general science. Two budget functions, general purpose fiscal assistance and interest, have no R&D components.

All the data shown in the following pages are based on budget authority dollars rather than obligations or outlays since budget authority is the basis of congressional funding decisions. The data shown agree for the most part with budget authority data supplied to OMB by the agencies. Some changes were made on the basis of information not available at the time the special analyses were prepared.

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RESEARCH AND DEVELOPMENT IN THE 1983 BUDGET

Total budget authority for all R&D programs, as proposed in the 1983 budget, is $43,174 million, 12 percent higher than the 1982 total of $38,701 million, allowing for growth ahead of inflation. This increase is considerably larger than the 5-percent increase in 1983 budget authority in the overall Federal budget.

The 1983 budget emphasizes the Government's role in creating a climate for innovation that encourages private R&D investment in response to the realities of the marketplace. Federal R&D support is targeted chiefly at areas of national security and other national needs for which there are insufficient economic incentives and resources for private sector investment. This policy is evidenced in continued Federal support for basic research and an emphasis on technology development for high-risk technologies that require long periods of initial development and where potentially large payoffs are anticipated, as in fusion power.

High priority is given in the 1983 budget, as in the 1982 budget, to improving national defense capabilities. In the two most recent budgets consistent real increases have been provided to defense and space and consistent large decreases to energy and natural resources and environment programs.

The leading features of R&D planning is the 1983 budget are as follows:

- An increase of $4,412 million, or 20 percent, in national defense R&D programs in 1983, following on an equally large relative increase in 1982.
- An increase of $657 million, or 12 percent, for space research and technology, with priority given to space shuttle flight operations and space science programs.
- A net decrease of $594 million, or 5 percent, for nondefense/nonspace R&D programs in 1983, following a decrease of $925 million, or 8 percent, in 1982.
- An increase of 9 percent for basic research, providing for some real growth; without defense, an increase of 8 percent in basic research in 1983 versus an increase of less than one-half of 1 percent for total nondefense R&D programs.
- A decrease of $855 million, or 30 percent, in energy R&D programs, following a decrease of $612 million, or 18 percent, in 1982.

- An increase of 4 percent for health R&D activities.
- An increase of 9 percent in general science programs in 1983, ahead of inflation, compared with an increase of less than 4 percent in 1982.
- An increase of 11 percent for transportation R&D activities in 1983, compared with a decrease of 14 percent in 1982.
- A decrease of 14 percent in natural resources and environment R&D programs in 1983, following a decrease of 10 percent in 1982.
- An increase of 7 percent for agriculture programs.

R&D budget authority in 1983 is 5.4 percent of total Federal budget authority, compared with 4.9 percent and 5.1 percent, respectively, in 1981 and 1982.

Shares of the R&D total

R&D priorities, measured in terms of shares of the total held by various functional areas, have shifted considerably over the 1981-83 period, with the most dramatic change occurring in national defense. This functional area accounted for 52 percent of the total in 1981, then grew to 57 percent in 1982 and 61 percent in the 1983 budget.

The share held by the space function has been relatively constant over the 1981 to 1983 period, at approximately 14 percent. The health share, however, has fallen from 11 percent in 1981 to 9 percent in 1983 and the energy share, from 10 percent to 5 percent in the same period.

In 1983 the four leading functions -- national defense, space, health, and energy -- account for 89 percent of the total. General science accounts for another 3 percent, and transportation, natural resources and environment, and agriculture each represent 2 percent. The remaining eight functions together account for 2 percent of the total.

Budget authority for research and development by budget function[a]
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$35,547	$38,701	$43,174
National defense	18,413	22,025	26,437
Space research and technology	4,924	5,390	6,047
Health	3,871	3,864	4,013
Energy	3,501	2,889	2,034
General science	1,340	1,387	1,509
Transportation	869	748	831
Natural resources and environment	1,061	952	819
Agriculture	659	694	740
International affairs	160	164	194
Education, training, employment, and social services	298	200	189
Veterans benefits and services	143	131	140
Commerce and housing credit	106	107	92
Community and regional development	104	63	45
Income security	43	35	41
Administration of justice	34	28	24
General government	22	23	22

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[a] Listed in descending order of 1983 budget authority. One budget function -- general science, space and technology -- has been divided into two functions in this analysis: Space research and technology, and general science.

Annual percent change in R&D budget authority for leading R&D support areas
/Dollars in millions/

	1981 actual	1982 estimate	Percent change 1981/82	1983 estimate	Percent change 1982/83
Total	$35,547	$38,701	8.9%	$43,174	11.6%
National defense	18,413	22,025	19.6	26,437	20.0
Space research and technology	4,924	5,390	9.5	6,047	12.2
Health	3,871	3,864	-.2	4,013	3.9
Energy	3,501	2,889	-17.5	2,034	-29.6
General science	1,340	1,387	3.5	1,509	8.8
Transportation	869	748	-14.0	831	11.0
Natural resources and environment ...	1,061	952	-10.3	819	-14.0
Agriculture	659	694	5.3	740	6.6
International affairs	160	164	2.5	194	17.9
Education, training, employment, and social services	298	200	-32.9	189	-5.4
All other functions	451	387	-14.2	364	-5.9

NATIONAL DEFENSE

The national defense function accounts for nearly 33 percent of total Federal budget authority in 1983 compared with 25 percent in 1981. As a fraction of all Federal R&D budget authority in 1983, defense R&D activities represent approximately 61 percent -- 10 percentage points more than in 1981.

Defense R&D budget authority is expected to increase $4,412 million over the 1982 level to $26,437 million in 1983 for an increase of 20 percent. The R&D activities in this function are sponsored by the Department of Defense (DOD) and the proposed Energy Research and Technology Administration (ERTA), which would be part of the Department of Commerce.

The key features of proposed 1983 R&D support within the defense function are as follows:

- An increase of 15 percent in DOD technology base between 1982 and 1983, to a total of $3,337 million. Basic research, included in technology base, is expected to advance 21 percent to a total of $828 million.
- An increase of 30 percent in DOD advanced technology development.
- An increase of 43 percent in DOD strategic programs, with two-fifths of the increase attributable to an increase in funding for the Air Force M-X missile.
- An increase of 10 percent in DOD tactical programs, the largest mission area in terms of 1983 budget authority.
- An increase of 26 percent in DOD intelligence and communications programs in 1983.
- A increase of 12 percent in ERTA atomic energy defense activities in the 1983 budget.

In 1983 R&D budget authority for national defense is an estimated 10 percent of total budget authority for this function, approximately the same share as in 1982.

Department of Defense - Military

Approximately 94 percent of all R&D budget authority for national defense is accounted for by DOD programs. Within DOD, virtually all defense R&D programs are funded under the research, development, test, and evaluation (RDT&E) appropriation.

All of the mission areas of the RDT&E appropriation are expected to receive increased support in 1983. In the proposal total budget authority for RDT&E would grow from $19,834 million to $24,043 million -- an advance of 21 percent.

Technology base funding would reach $3,337 million in 1983, for an increase of $430 million, or 15 percent over the 1982 level. All programs in technology base are research as distinct from development. Budget authority for DOD basic research, now approximately one-fourth of technology base, is expected to increase 21 percent in 1983, continuing a strong growth trend evident since 1979.

Advanced technology development programs are scheduled to receive an increase of $217 million, or 30 percent, in 1983 to a total of $952 million. Emphasis will be placed on laser technology, materials development, and very high speed integrated circuits.

Strategic programs show the greatest relative increase of any mission area. Proposed budget authority in 1983 is 43 percent greater than the 1982 level for a total of $6,647 million. This represents an increase of $2,004, of which $796 million would be directed to efforts toward full-scale development of the Air Force M-X missile system. Other major strategic programs include development of a new Trident II missile, an upgraded version of the B-1 bomber, ballistic missile defense systems technology, and an improved command control and communications capability. Development of long-term ICBM basing and space defense are programs also included in the strategic group.

Tactical programs are expected to increase by $676 million in 1983. Budget authority of $7,576 million would support work on lightweight, highly mobile armored vehicles and weapons, and helicopter development. It would also support advancements in target acquisition and command and control technology. In sea control, increased efforts are directed at developing the MK-48 torpedo and the DDGX destroyer. Air warfare programs include an advanced medium range air-to-air missile (AMRAAM) and advanced technology F-15 tactical fighters.

Intelligence and communications programs show an increase of $570 million, or 26 percent, to a total of $2,772 million in 1983. Included in this area is support for the NAVSTAR global positioning system supported jointly by all three services.

R&D budget authority for national defense
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$18,413	$22,025	$26,437
Department of Defense - military	17,060	20,519	24,732
Research, development, test and evaluation	16,472	19,834	24,043
Technology base	2,600	2,907	3,337
Advanced technology development	593	735	952
Strategic programs	3,440	4,643	6,647
Tactical programs	6,130	6,900	7,576
Intelligence and communications	1,632	2,202	2,772
Defensewide mission support	2,077	2,447	2,759
Other DOD military	588	684	689
Atomic energy defense activities (ERTA)[a]	1,348	1,501	1,687
Naval reactors development	250	277	327
Weapons research, development and testing	793	934	1,075
Inertial confinement fusion	140	122	105
Verification and control	14	19	20
Materials production	26	38	37
Defense nuclear waste management	82	68	80
Nuclear materials and safeguards development	43	42	43
Federal Emergency Management Agency	5	6	18

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[a] Energy Research and Technology Administration, proposed as part of the Department of Commerce.

Defensewide mission support is expected to increase $312 million, or 13 percent, to a total of $2,759 million in 1983. This activity supports ranges and test facilities and studies and analyses. Also included here is major DOD support for the space shuttle.

Atomic energy defense activities (ERTA)

R&D budget authority for atomic energy defense activities is requested at $1,687 in 1983, a 12-percent increase above the 1982 level. These programs, to be conducted by the proposed Energy Research and Technology Administration under the Department of Commerce in 1983, account for approximately 6 percent of the 1983 national defense R&D budget authority total.

Weapons research, development and testing accounts for 64 percent of atomic energy defense activities, or $1,075 million in 1983, an increase of 15 percent over 1982. The next largest program is naval reactors development, up 18 percent.

Among the remaining programs, the only significant increase is shown in defense nuclear waste management, up 18 percent. Verification and control and nuclear materials and safeguards development show slight increases and materials production, a slight decrease.

SPACE RESEARCH AND TECHNOLOGY

The National Aeronautics and Space Administration (NASA) conducts all the R&D activity under the space function. The R&D request for space research and technology in 1983 is $6,047 million in budget authority, 12 percent over the 1982 level. The overall increase is the net effect of increases for high-priority activities, e.g., space shuttle systems and support operations offset only partially by reductions for lower-priority projects, including some in planetary exploration and in areas where private industry might more efficiently perform the same research and development tasks, as in communications satellites. Major features of the 1983 plan for space research and technology include the following:

- o An increase in basic research of $91 million, or 19 percent in 1983 over 1982, to $573 million.
- o An increase of $404 million, or 11 percent, in space transportation systems support, including an $811 million increase in the space flight operations program and a partially offsetting $445 million decrease in the space shuttle program.
- o An increase of $126 million, or 18 percent, in space science programs, including continued development of the space telescope, the gamma ray observatory, shuttle/spacelab astronomy experiments, and the Galileo mission to Jupiter.
- o A slight reduction in the space and terrestrial applications program, including a 26-percent reduction in Landsat-D funding, reflecting completion of Landsat development activities during 1983.
- o An increase of 24 percent in supporting activities, made up in large part by initial lease payments for a new tracking and data relay satellite system (TDRSS).

All the activities under space research and technology are either R&D or construction of R&D facilities. Therefore, the ratio of R&D budget authority to total budget authority for this function is very high -- 99 percent in 1983.

R&D budget authority for space research and technology
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$4,924	$5,390	$6,047
National Aeronautics and Space Administration	4,924	5,390	6,047
Space transportation systems	3,177	3,558	3,962
Space science, applications, and technology	1,357	1,381	1,524
Space science	685	718	844
Space and terrestrial applications	460	458	456
Space research and technology	187	191	210
Energy technology	25	14	14
Supporting activities (tracking and data acquisition)	389	452	561

[a] Less than $500,000.

Space transportation systems (STS)

This program, which provides the transportation and related capabilities required to conduct space operations, shows requested budget authority of $3,962 million in 1983, a $404 million, or 11 percent, increase over the 1982 level. STS programs command 66 percent of the 1983 space R&D total.

STS programs include the production and operation of the space shuttle, one of the largest single R&D programs in the Federal budget; procurement and operation of the European-developed Spacelab for use in the space shuttle; and development and procurement of space vehicles needed to carry satellites into high-Earth orbit and to launch planetary exploration spacecraft.

Space shuttle funding will decrease $445 million in 1983 to $1,718 million, 21 percent below the 1982 level. Design, development, test and evaluation (DDT&E) is expected to be completed during 1982, and emphasis in 1983 will be on continued production of the next three orbiters. Increased funding for spares and equipment, up 67 percent to $323 million in 1983, will allow replacement parts to be available for Columbia, the present orbiter, as well as for future shuttle orbiters as wear and tear or breakage requires. The $72 million to be budgeted for changes and systems upgrading will meet additional requirements and improvements needed as a result of actual flight experience. The $60 million for performance augmentation in 1983 will allow a first demonstration of an in-orbit satellite repair and will fund modification to the solid rocket to permit the shuttle to carry heavier payloads.

Space flight operations shows a proposed request of $1,707 million in 1983, or $811 million more than the 1982 level. The major factor in this increase is an $891 million increase in STS operations, a program which integrates transportation services and operational activities for the space shuttle, Spacelab, and upper stages. Greatest emphasis will be on shuttle operations as the shuttle system becomes completely functional.

The large increases in STS operations will be offset to some extent by a $102 million decrease in development, test, and mission support (DTMS), which provides the engineering, scientific, and technical support required to conduct STS research and development. Starting in 1983, DTMS will be redefined and retitled as engineering and technical base (ETB). Funded at $82 million in 1983, the redefined ETB will provide only for minimal core capability to sustain an engineering and development base for various STS programs; within ETB funding for data systems and flight support will be cut from $43 million in 1982 to $13 million in 1983, and launch systems support from $60 million to $3 million.

While most expendable launch vehicles will be replaced by the shuttle system in full operation, the 1983 budget includes $43 million for the Delta rocket, which will boost the Landsat-D into orbit in mid-1982. Scout and Centaur launchings will occur only on a fully reimbursable basis (primarily by DOD and Intelsat) and will require no further funding.

R&D budget authority for space transportation systems
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$3,177	$3,558	$3,962
Space shuttle	1,995	2,163	1,718
Design, development, test and evaluation	973	898	-
Orbiter	510	422	-
Main engine	134	130	-
External tank	64	56	-
Solid rocket booster	50	30	-
Launch and landing	214	260	-
Production	1,022	1,260	1,586
Orbiter	779	860	934
Main engine	112	144	262
Launch and landing	33	63	67
Spares and equipment	98	193	323
Changes/system upgrading	-	-	72
Performance augmentation	-	5	60
Space flight operations	679	896	1,707
Space transportation system operations capability development	82	79	85
Space transportation system upper stage	38	23	32
Multimission and payload support equipment	16	15	17
Mission control center (MCC) upgrading level II	16	25	22
Payload and operations support	9	14	10
Space transportation system operations effectiveness	-	3	4
Performance augmentation studies	3	(a)	-
Development, test and mission support	184	184	82
Research and test support	35	33	35
Data systems and flight support	38	43	13
Operations support	51	48	32
Launch systems support	58	60	3

Advanced programs	12	9	12
Spacelab	139	101	113
Space transportation system operations	263	523	1,414
Shuttle operations	214	435	1,317
Upper stage operations	31	68	63
Payload support	19	20	34
Expendable launch vehicles	54	31	43
Scout	1	1	-
Centaur	6	-	-
Delta	48	30	43
Research and program management	448	468	494

[a] Less than $500,000

Space science

Budget authority for space science missions in 1983 is requested at $844 million, 18 percent higher than the previous year, and representing 14 percent of the total space R&D budget. The objective of the space science program is to study the solar system and the universe, using satellites in Earth orbit and spacecraft sent to planets and their moons, and to carry out life sciences research related to the space environment. The two major missions in 1983 are development of the space telescope, with proposed budget authority of $138 million, representing 16 percent of the space science budget, and Galileo development, with $93 million, or 11 percent, of the space science budget.

Proposed 1983 budget authority for the overall physics and astronomy program is $472 million, an increase of $148 million, or 46 percent, over the 1982 level. Four programs account for $120 million of this increase. International solar polar mission (ISPM) development, scheduled at $21 million, will increase $16 million to further the development of the scientific instruments to be flown on the single-craft mission. Gamma ray observatory (GRO) development, at $34 million in 1983, will move from early phases of choosing contractors and initiating design to the more expensive phases of tooling up for spacecraft structure and development of spacecraft hardware. The increase over 1982 is $26 million. Shuttle/spacelab payload development, expected to double to $81 million in 1983, will support development of instruments and experiments for future flights. Mission operations and data analysis, at $86 million in 1983, reflects a $36 million increase, mostly attributed to preparations for operating the space telescope which, because it will be aloft for more than a decade, will require a well established operations center to coordinate and manage periodic in-orbit maintenance, recovery, refurbishment and relaunch, and in-orbit change-out of the scientific instruments.

R&D budget authority for space science
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$685	$718	$844
Physics and astronomy	324	324	472
Space telescope (ST) development	119	122	138
International solar polar mission (ISPM) development	28	5	21
Gamma ray observatory (GRO) development	8	8	34
Shuttle/spacelab payload development and mission management	27	40	81
Explorer development	33	33	34
Mission operations and data analysis	39	50	86
Research and analysis	38	33	39
Suborbital program	31	33	38
Planetary exploration	176	205	155
Galileo development	63	120	93
Mission operations and data analysis	62	38	27
Research and analysis	51	47	36
Life sciences	42	40	56
Life sciences flight experiments	13	14	24
Research and analysis	29	26	32
Research and program management	144	150	162

Proposed support for the planetary exploration program, at $155 million, is 25 percent below the 1982 level. The Galileo mission to Jupiter, a joint effort of the United States and the Federal Republic of Germany, is the major activity under this program. Galileo development support continues, with the mission scheduled for a 1985 launch. As the fabrication of major subsystems will be completed during 1982, efforts in 1983 will be directed toward continued production of the orbiter itself.

Life sciences support is scheduled to increase $16 million, to $56 million, in 1983, supporting definition and development of investigations to be flown in Spacelab 4, and designing the flight hardware to carry out the mission. This will be the first shuttle mission dedicated to life sciences experiments.

Space and terrestrial applications

This program uses space, aircraft, and ground-based systems to identify useful applications of space techniques in advanced communications satellite systems technology, materials processing research, and remote sensing to assist in solving Earth resources and environmental problems. The proposed $456 million for these programs in 1983 is virtually the same as the 1982 level. The two major groups of projects in this broad program area, resource observations and environmental observations, each command approximately 29 percent of the 1983 space and terrestrial applications requested budget authority.

Resource observations projects develop and apply space observation techniques to monitor and forecast the output of major agricultural commodities, monitor water and energy resources, aid in land management, and aid in understanding the dynamic characteristics of the Earth. These projects total $132 million in 1983, down $14 million, or 10 percent from 1982.

Funding will continue for development of a fourth and fifth Landsat spacecraft, with the fourth, Landsat-D', scheduled for a launch during 1982. Because all elements needed to complete the assembly of Landsat-D have been delivered and integrated, 1983 funding of $62 million, 26 percent lower than in 1983, would cover integration and performance testing of Landsat-D', and operation of the Landsat-D mission for six months, after which time the National Oceanic and Atmospheric Administration (Commerce) will fund and operate the facilities necessary for spacecraft control, mission management, and multispectral scanner (MSS) data processing. The AgRISTARS agriculture and resources inventory survey will continue at approximately the same level as in 1982, and the geodynamics program will increase by $3 million to $26 million.

Environmental observations projects show a total request of $129 million in 1983, 11 percent more than in 1982. This program will support continued efforts to monitor, and improve understanding of, environmental processes and phenomena. A $3 million increase in the upper atmosphere research (UAR) program would further research to assess and evaluate man-made and natural perturbances of the stratospheric ozone layer. The upper atmosphere research satellite experiments (UARSE) program, to design and develop instruments necessary to accomplish the UAR mission, is proposed at $14 million in 1983, more than double the 1982 budget. This would support design, development, and definition of instruments, work on selected payloads, and experiments for a scheduled 1987-88 launch of a UAR satellite. An $8 million increase for applied research and data analysis is distributed among all the environmental studies subprograms. The earth radiation budget experiment, designed to measure variations in radiation balance over the globe, continues to receive support although the halogen occulation experiment (HALOE) has been removed from its payload.

R&D budget authority for space and terrestrial applications
[Dollars in millions]

	1981 actual	1982 estimate	1983 estimate
Total	$460	$458	$456
Resource observations	151	146	132
Landsat-D	88	84	62
Magnetic field satellite	1	-	-
Extended mission operations	3	3	2
Shuttle/spacelab payload development	2	3	3
AgRISTARS	21	14	15
Applied research and data analyses	13	20	25
Geodynamics	23	23	26
Environmental observations	104	116	129
Upper atmosphere research program	14	13	16
Applied research and data analysis	48	47	55
Shuttle/spacelab payload development	2	4	4
Operational satellite improvement program	7	6	6
Earth radiation budget experiment	20	24	24
Halogen occulation experiment	4	5	-
Extended mission operations	8	11	10
National oceanic satellite system (NOSS)	1	-	-
UAR satellite experiments and mission definition	-	6	14
Applications systems	18	13	12
Technology transfer	8	5	-
Materials processing in space	19	24	24
Communications and information systems	31	21	20
Technology utilization	9	8	4
Research and program management	120	124	136

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[a] Less than $500,000.

Technology utilization programs are to be phased down, and technology transfer programs to be phased out in 1983, in accordance with an administration policy of limiting Federal involvement in research and development activities that are deemed to be the province of the private sector. The materials processing in space and communications and information systems programs, however, are expected to continue at approximately the same levels.

Space research and technology

Space research and technology encompasses NASA advanced research and technology programs designed to support and extend such critical aerospace disciplines as aerothermodynamics, chemical propulsion, materials and structures, electronics and automation, and space power and electric propulsion. The 1983 proposed budget authority of $210 million is 10 percent over the 1982 level. The increase would be spread across the spectrum of research and technology base disciplines and programs.

R&D budget authority for space research and technology
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$187	$191	$210
Research and technology base	100	105	116
Aerodynamics research and technology	8	8	9
Chemical, propulsion research and technology	12	14	16
Materials and structure research and technology	14	14	15
Electronics and automation research and technology	8	8	10
Space power and electric propulsion research and technology	19	18	20
Multidisciplinary research and technology	3	3	4
Information systems research and technology	21	23	24
Spacecraft systems research and technology	9	9	10
Transportation systems research and technology	7	8	9
Systems technology program	8	3	4
Standards and practices	2	3	3
Research and program management	76	80	86

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[a] Less than $500,000.

Supporting activities (tracking and data acquisition)

This program provides tracking, command, telmetry, and data acquisition support to meet the requirements of all NASA space flight projects as well as projects of DOD, and, on a reimbursable basis, projects of other Government agencies, of commercial firms, and other countries and international organizations engaged in space research endeavors. The 1983 budget contains $561 million for tracking and data acquisition, $109 million more than in 1982. Much of the increase would be used to initiate lease payments for a new tracking and data relay satellite system (TDRSS), the first component of which is to be launched from the shuttle in 1983.

R&D budget authority for supporting activities (tracking and data acquisition)
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$389	$452	$561
Operations	266	300	338
Space flight tracking and data network.	131	144	184
Deep space network	54	63	61
Aeronautics and sounding rocket support	6	7	7
Communications operations	38	40	46
Data processing	38	47	40
Systems implementation	62	89	96
Spaceflight tracking and data network..	23	26	22
Deep space network	20	37	45
Aeronautics and sounding rocket support	3	6	4
Communications operations	3	4	6
Data processing	13	16	19
Advanced systems	11	12	13
Tracking and data relay satellite system	-	-	61
Research and program management	49	49	52

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[a] Less than $500,000

HEALTH

Proposed R&D budget authority for health reflects an increase of $149 million, or 4 percent, in 1983 over 1982, to a total of $4,013 million. Almost all the programs within this function are conducted by the Department of Health and Human Services (HHS). Major features of the proposed 1983 R&D program are these:

- A 3-percent increase in basic research, to $2,066 million.
- An 3-percent increase to $3,533 million, for the National Institutes of Health (HHS).
- A 14-percent increase to $289 million, for the Alcohol, Drug Abuse, and Mental Health Administration (HHS).

R&D budget authority for health as a share of total budget authority is an estimated 5 percent in the 1983 budget.

R&D budget authority for health
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$3,871	$3,864	$4,013
Health research	3,792	3,787	3,933
National Institutes of Health (HHS)	3,334	3,427	3,533
Alcohol, Drug Abuse, and Mental Health Administration (HHS)	298	254	289
Centers for Disease Control (HHS)	74	69	70
Disease control	19	17	22
Occupational health	55	52	48
Assistant Secretary for Health (HHS) ...	36	20	20
National Center for Health Services Research	29	16	16
National Center for Health Care Technology	3	-	-
National Center for Health Statistics	4	4	4
Health Care Financing Adm. (HHS)	26	12	20
Health Services Administration (HHS) ...	16	3	1
Health Resources Administration (HHS) ..	5	2	-
Special foreign currency program (HHS) .	2	-	-
Consumer and occupational health and safety	79	78	80
Food and Drug Administration (HHS)	71	73	75
Occupational Safety and Health Adm. (Labor)	8	5	6

National Institutes of Health (HHS)

The National Institutes of Health (NIH) are responsible for Federal conduct and support of biomedical research into the diagnosis, treatment, cause, and prevention of disease. NIH comprises 88 percent of the health R&D budget authority total in the 1983 budget.

The 1983 proposal of $3,533 million in R&D budget authority for NIH provides $106 million, or 3 percent more support than in 1982 for biomedical research. As in the previous budget, research projects grants are the first budget priority in 1983. All NIH institutes would receive slight relative increases in 1983, varying from 2 percent to 5 percent. Absolute increases range from $2 million to $20 million.

The National Cancer Institute commands the largest share of the NIH budget with $930 million in 1983, or 26 percent. The National Heart, Lung, and Blood Institute accounts for $550 million, or 16 percent, and the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases, at $360 million, represents 10 percent of the NIH 1983 R&D budget authority.

A $16 million, or 2-percent, increase for the National Cancer Institute would be divided among carcinogenesis, tumor biology, and preclinical and clinical treatment research programs.

The National Heart, Lung, and Blood Institute is scheduled to receive the largest absolute increase in the 1983 budget proposal, $20 million, or 4 percent, with small increases shown in all areas.

Other institutes receiving $10 million or more over the 1982 level are Arthritis, Diabetes, and Digestive and Kidney Diseases (up $10 million), General Medical Sciences (up $11 million), and Allergy and Infectious Diseases (up $11 million).

R&D budget authority for the National Institutes of Health (HHS)
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$3,334	$3,427	$3,533
Cancer	915	914	930
Epidemiology	NA	56	55
Carcinogenesis (physical and chemical)	NA	91	93
Biological carcinogenesis	NA	89	89
Nutrition	NA	15	15
Tumor biology	NA	110	114
Immunology	NA	79	75
Diagnostic research	NA	38	39
Preclinical treatment research	NA	138	141
Clinical treatment research	NA	155	161
Rehabilitation research	NA	1	2
Cancer centers support	NA	74	77
Cancer control	NA	56	55
Direct operations and program management	NA	12	12
Heart, lung, and blood	516	530	550
Heart and vascular diseases	NA	300	309
Lung diseases	NA	76	80
Blood diseases and resources	NA	73	75
Intramural research	NA	48	52
Direct operation and program management	NA	33	34
Arthritis, diabetes, and digestive and kidney diseases	349	350	360
Arthritis, bone and skin diseases	NA	59	61
Diabetes, endocrinology and metabolism	NA	123	124
Digestive diseases and nutrition	NA	52	52
Kidney diseases, urology, and hematology	NA	56	58
Intramural research	NA	48	51
Direct operations and program management	NA	13	14
General medical sciences	275	288	299
Cellular and molecular bases of diseases	NA	93	99
Genetics	NA	119	122
Pharmacological sciences	NA	34	32
Physiology and biomedical engineering	NA	33	37
Intramural research	NA	1	1
Direct operations and program management	NA	9	9

Neurological and communicative disorders and stroke	243	257	265
Biological basis research	NA	116	118
Clinical research	NA	87	89
Intramural research	NA	39	42
Direct operations and program management	NA	15	15
Allergy and infectious diseases	223	227	238
Immunology, allergic and immunologic diseases	NA	69	70
Microbiology and infectious diseases	NA	104	107
Intramural research	NA	43	47
Direct operations and program management	NA	12	13
Child health and human development	211	217	225
Research for mothers and children	NA	101	102
Population	NA	79	83
Intramural research	NA	26	28
Direct operations and program management	NA	11	12
Eye	114	124	128
Retina and choroidal diseases	NA	44	46
Corneal diseases	NA	17	17
Cataract	NA	10	10
Glaucoma	NA	11	11
Sensory motor disorders and rehabilitation	NA	24	24
Intramural research	NA	12	14
Direct operations and program management	NA	5	5
Environmental health	133	148	153
Characterization	NA	11	11
Biological response	NA	23	23
Applied toxicological research	NA	53	51
Biometry	NA	3	3
Resource development	NA	10	12
Intramural research	NA	42	46
Direct operations and program management	NA	5	6
Aging	73	80	82
Aging research	NA	59	59
Intramural research	NA	14	16
Direct operations and program management	NA	6	7

Dental	66	67	70
Caries research	NA	8	9
Periodontal diseases	NA	9	9
Restorative materials	NA	4	4
Craniofacial anomalies	NA	8	7
Pain control and behavior studies	NA	3	3
Soft tissue, stomatology, and nutrition	NA	7	8
Dental research institutes	NA	7	7
Intramural research	NA	15	16
Direct operations and program support	NA	7	8
Research resources	175	183	190
Clinical research	NA	64	67
Biotechnology research	NA	20	21
Laboratory animal sciences and primate research	NA	25	26
Biomedical research support	NA	50	51
Minority biomedical support	NA	18	19
Direct operations and program management	NA	6	6
John E. Fogarty International Center	NA	9	10
National Library of Medicine	NA	12	12
Office of the Director	NA	21	22

Alcohol, Drug Abuse, and Mental Health Administration (HHS)

The $289 million requested in the 1983 budget for Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) R&D programs represents a 13-percent increase over the 1982 budget. Each of the three major institutes -- general mental health, drug abuse, and alcohol abuse -- is expected to receive increased funding, for both intramural and extramural programs; the increases are proposed to enable the agency to strengthen its role in prevention.

General mental health budget authority for 1983, at $150 million, shows a 7-percent increase over 1982 and is expected to support basic and applied research in the neurosciences and mental disorders. The increase includes the purchase of and staff salaries for operation of a positron emission tomography (PET) scanner for use in diagnostic procedures.

Drug abuse R&D programs are scheduled for a 16-percent increase in 1983 -- up $6 million to $46 million. Basic drug research is expected to continue in all areas, and studies will continue to be conducted on substance abuse behavior.

For alcoholism research a $12 million, or 65-percent, increase would continue efforts to develop new knowledge on the causes and consequences of harmful alcohol use to aid in reducing the incidence and prevalance of alcohol abuse and alcoholism. The increase would support the establishment of a core staff and support laboratories for the alcoholism clinical research ward at NIH.

R&D budget authority for Alcohol, Drug Abuse, and Mental Health Administration (HHS)
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$298	$254	$289
General mental health research	151	140	150
Extramural research	110	94	100
Schizophrenic disorders	20	17	17
Depression and manic depressive illness	17	14	15
Mental disorders of aging	5	4	5
Childhood disorders	7	6	6
Anxiety disorders	4	3	3
Stress and psychosomatic disorders	13	11	11
Basic studies in brain and behavior	28	26	27
Epidemiology	6	6	6
Prevention	4	3	4
Other mental health areas	5	5	5
Intramural research	42	46	50
Drug abuse research	45	40	46
Extramural research	41	35	42
Basic drug research	10	8	10
Heroin and narcotics	9	7	8
Marijuana and cannabinoids	5	4	5
Cocaine and stimulants	3	2	4
Sedatives and tranquilizers	2	2	2
Hallucinogens	2	2	2
Other drugs of abuse	4	3	3
Prevention	4	3	4
Epidemiology	2	4	5
Intramural research	3	4	4
Alcoholism research	22	20	33
Program support	80	53	59
St. Elizabeth's Hospital	1	-	-

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[a] Less than $500,000

Health Care Financing Administration (HHS)

This agency shows proposed R&D budget authority for $20 million in 1983, up $8 million, or 67 percent from 1982. Emphasis will be placed on research and demonstration initiatives to develop and test ways to increase competition in health care financing.

Assistant Secretary for Health (HHS)

The requested 1983 R&D budget authority of $20 million is the same as in 1982. Research activities of the National Center for Health Care Technology expired at the end of 1981, and were assumed by the National Center for Health Services Research.

ENERGY

Total R&D budget authority for energy in 1983 is $2,034 million, down $855 million, or 30 percent from 1982. This budget request reflects an administration policy of phasing down or terminating federally sponsored R&D programs to accelerate the introduction of new energy technologies. Private development of new and improved energy technologies is now encouraged through rising energy prices, tax credits, and regulatory incentives.

Three agencies are involved in R&D efforts in energy: the proposed Energy Research and Technology Administration (ERTA) as part of the Department of Commerce, the Nuclear Regulatory Commission (NRC), and the Environmental Protection Agency (EPA). Major changes in 1983 for energy R&D programs are as follows:

- An increase of 16 percent in basic research to $276 million in 1983 over 1982.

- Increases in 1983 over 1982 for magnetic fusion (up 23 percent to $359 million) and supporting research (up 12 percent to $273 million).

- Elimination of the electric energy and energy storage systems program in 1983.

- Reductions in 1983 of 78 percent in geothermal programs to a total of $10 million, 77 percent in energy conservation programs to a total of $19 million, and 70 percent in solar energy programs to a total of $73 million in line with administration policy of relying on market forces for development in these areas.

- A decrease of 23 percent to $717 million in the nuclear fission program with an increase included for the Clinch River breeder reactor project.

- A reduction of 20 percent in DOE biological and environmental research to $121 million.

- A decrease of 34 percent in EPA energy R&D programs to $35 million in 1983.

Energy R&D budget authority as a percent of total energy budget authority is an estimated 47 percent in 1983.

R&D budget authority for energy
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$3,501	$2,889	$2,034
Energy Research and Technology Administration (Commerce)	3,170	2,613	1,779
Solar	442	248	73
Geothermal	131	44	10
Hydropower	7	3	-
Nuclear fission	886	927	717
Magnetic fusion	259	293	359
Electric energy and energy storage systems	85	57	-
Biological and environmental research	148	151	121
Supporting research	235	244	273
Fossil energy	650	407	104
Energy conservation	197	84	19
Uranium enrichment	131	156	104
Nuclear Regulatory Commission	227	223	220
Environmental Protection Agency	104	52	35

Solar energy

Total R&D budget authority for solar energy in 1983 is $73 million, down $175 million, or 70 percent, from the $248 million estimated for 1982. This plan reflects the administration's reliance on the principles of marketplace supply and demand.

All solar energy programs except solar international programs, received large reductions or elimination in 1983, to conclude solar demonstration and test facility activities supported in prior years while seeking their transition to private sector operation and support.

Funding of $10 million for solar international programs in 1983 represents the final request to complete the United States commitment to the Saudi Arabian Government for solar applications under the Project Agreement for Cooperation in the Field of Solar Energy (SOLERAS).

R&D budget authority for solar energy
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$442	$248	$73
Active heating and cooling	40	11	-
Passive and hybrid systems	31	10	-
Photovoltaic energy technology	126	70	27
Solar thermal technology	84	51	18
Biomass energy technology	31	20	7
Conversion technology development	NA	17	5
Feedstock development: aquatic systems R&D	NA	3	2
Wind energy systems technology	58	34	5
Ocean energy systems	34	18	-
Alcohol fuels	18	10	3
Solar international programs	11	4	10
Solar information systems	1	7	-
Solar program support	-	3	1
Solar reserve account	-	6	-
Program direction	7	4	2

Geothermal energy

R&D budget authority for geothermal energy R&D programs is expected to decrease $35 million, or 78 percent in 1983 to a total of $10 million. The goal of this program is to perform research which will lead to the development of a technology base that could be used for future development by the private sector. Accordingly, this program is structured around three areas: orderly completion of the hydrothermal industrialization project pending access of reliable research data; completion of the government involvement in the geopressure resource work as the private sector assumes greater responsibility; and the performance of geothermal technology development in hot dry rock and hydrothermal technology. The latter project is planned for further reduction and completion by 1985.

R&D budget authority for geothermal energy
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$131	$44	$10
Hydrothermal industrialization	49	9	-
Geopressure resources	31	14	2
Geothermal technology development	49	20	7
Hot dry rock technology	14	10	2
Hydrothermal technology	35	10	4
Program direction	2	2	(a)

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[a] Less than $500,000.

Nuclear fission

R&D budget authority for nuclear fission is expected to decline from $927 million in 1982 to $717 million in 1983. This net reduction of $211 million, or 23 percent, includes relatively large cutbacks in converter reactor systems and commercial nuclear waste activities but includes increased emphasis on nuclear fuel cycle activities.

A decrease of $60 million, or 69 percent, in converter reactor systems activities includes the termination of the high temperature reactors and advanced reactor systems programs as well as a deemphasis of light water reactor (LWR) systems. Three Mile Island activities will shift emphasis toward development work associated with the defueling and treatment of abnormal wastes. This shift will reduce the need of additional funding in 1983 by $4 million.

A proposed decrease of $135 million, or 69 percent, in the commercial waste management program reflects the transfer of funding for site characterization of exploratory shafts and mine repository-related activities to the Nuclear Waste Disposal Fund in 1983.

A decrease of $22 million, or 4 percent, in 1983 in breeder reactor systems includes the elimination of funds for the large developmental plant project of the liquid metal fast breeder reactor (LMFBR) program and a reduction of $58 million, or 20 percent, in the LMFBR base program due to advances in fuel design and fuel performance. A $59 million, or 30 percent, increase is shown in the Clinch River breeder reactor plant project (in conjunction with the licensing activities of the Nuclear Regulatory Commission).

An increase of $8 million, or 18 percent, in the nuclear fuel cycle program is directed to waste treatment and storage technology.

The advanced nuclear systems program is expected to decrease $4 million, or 11 percent in 1983. This decrease includes the elimination of the terrestrial applications activities of the space and terrestrial applications program as well as an increase of $3 million, or 29 percent, in flight systems development activities.

R&D budget authority for nuclear fission

/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$886	$927	$717
Converter reactor systems	79	87	27
High temperature reactors	38	34	-
Light water reactor systems	33	22	4
Three Mile Island activities	6	25	21
Advanced reactor systems	1	4	-
Program direction	1	1	1
Commercial nuclear waste	170	196	61
Remedial actions	7	4	6
Breeder reactor systems	532	563	541
Liquid metal fast breeder reactor (LMFBR)	462	502	487
Large developmental plant	NA	15	-
Clinch River breeder reactor plant project	NA	194	253
Base program	NA	293	234
Water cooled breeder	59	51	42
Shipping port atomic power station	NA	12	12
Light water breeder reactor	NA	31	30
Advanced water breeder reactor	NA	8	-
Program direction	11	10	12
Nuclear fuel cycle	61	45	53
Spent fuel technology	9	6	6
Fuel reprocessing R&D	42	33	33
Waste treatment and storage technology	9	5	13
Program direction	1	1	1
Advanced nuclear systems	38	33	29
Space and terrestrial applications	37	32	28
Flight systems development	NA	10	14
Flight systems support	NA	20	14
Terrestrial applications	NA	2	-
Program direction	1	1	1

Magnetic fusion

R&D budget authority for magnetic fusion programs shows an increase of $66 million, or 23 percent to a total of $359 million. More than one-half of the gain is devoted to confinement systems, which include the generic toroidal and mirror systems. The proposed increase of $57 million, or 45 percent, in this program will cover expansion of experimental studies of basic tokamak physics issues as well as the production of fusion power.

The applied plasma physics program is the second largest area within magnetic fusion and shows a proposed increase of $6 million, or 9 percent. This subprogram will continue the increase of applied physics knowledge for advancement of the fusion program and covers development of promising fusion concepts other than tokamaks and mirrors. A large percentage of plasma physicists and engineers employed in all areas of the fusion program receive their training under this program.

The development and technology program shows a $4 million, or 5-percent, increase in 1983 that would provide additional funding for the Center for Magnetic Fusion Engineering (CMFE).

The CMFE is subsumed within the fusion systems engineering subprogram, which shows an overall net loss of $3 million, or 16 percent.

Planning and projects programs remain unchanged in total funding in 1983 and will continue to provide major plasma sealing and technology development information to the major construction projects.

R&D budget authority for magnetic fusion
[Dollars in millions]

	1981 actual	1982 estimate	1983 estimate
Total	$259	$293	$359
Applied plasma physics	66	67	73
Advanced fusion concepts	16	17	19
Experimental plasma research	18	16	17
Fusion theory	19	21	23
National MFE computer network	11	13	15
Confinement systems	93	124	181
Toroidal confinement systems	65	90	138
Mirror confinement systems	27	35	43
Development and technology	63	71	74
Magnetics	13	15	17
Plasma engineering	19	16	20
Fusion reactor materials	12	15	16
Fusion systems engineering[a]	14	20	17
Environment and safety	2	3	3
Fusion energy applications	2	2	2
Planning and projects	35	26	26
Tokamak fusion test reactor	22	17	20
Mirror fusion test facility	4	7	6
Fusion materials irradiation test facility	8	2	-
Program direction	3	3	3

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[a] Includes funding for the Center for Magnetic Fusion Energy.

Electric energy and energy storage systems

The phase-out of the electric energy systems program commenced in 1982 and will be completed in 1983. Prior-year budget authority will permit an orderly completion of the program. Efforts include close coordination with the electric utility industry to achieve the greatest return from government investments to enhance the possibility that the most commercially attractive projects are adopted by the private sector.

No new budget authority is requested for energy storage systems. Funds appropriated in 1982 and prior years will be used to bring development project funding to an orderly conclusion.

These programs are being phased out in the light of the administration's reliance on the marketplace to develop and introduce new technologies at rates consistent with their economic potential.

R&D budget authority for electric energy and energy storage systems
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$85	$57	-
Electric energy systems	34	24	-
Systems architecture and integration	17	7	-
Power delivery	17	13	-
Generation and storage application	-	4	-
Program direction	1	1	-
Energy storage systems	51	32	-
Electrochemical storage	27	20	-
Physical and chemical storage	23	12	-
Program direction	1	1	-

Biological and environmental research

R&D budget authority for environmental programs shows a proposed decrease of $30 million, or 20 percent, to $121 million in 1983. This program represents the Government's only long-term, multidisciplinary research effort to address energy-related health and environmental issues, identify at an early stage any potential adverse effects on human health or the environment, and recommend areas where mitigative action should be taken.

In 1983, all programs except human health research, will be reduced. Research will be focused more heavily on resolving the long-term, generic health and environmental uncertainties associated with the increased production and use of various alternative energy options. Shorter-term, process-specific research will be deemphasized.

R&D budget authority for biological and environmental research
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$148	$151	$121
Human health research	NA	26	26
Health effects research in biological systems	NA	47	38
Environmental research	NA	29	23
Physical and technological research	NA	31	24
Carbon dioxide research	NA	12	8
Health and environmental risk analysis ..	NA	4	-
Program direction	3	3	3

Supporting research

An increase of $28 million, or 12 percent, to $273 million is anticipated in 1983 in R&D budget authority for supporting research. A $35 million, or 15-percent, increase for basic energy sciences includes an $8 million, or 35-percent increase, in nuclear science projects and a $6 million, or 24-percent, increase in engineering, mathematical and geosciences.

The basic energy sciences programs covers long-range, mission-oriented research to provide the fundamental scientific and engineering base on which the Nation's future energy options depend. New knowledge is developed by sponsoring research in the traditional disciplines.

Within supporting research, university research support is planned to decrease from $11 million in 1982 to $5 million in 1983. Phased-out projects may be continued under other agency and non-Federal auspices.

R&D budget authority for supporting research
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$235	$244	$273
Basic energy sciences	209	226	261
Nuclear science	20	23	31
Stanford Positron Electron Asymmetric Ring	-	-	6[a]
Nuclear data measurements activity	NA	6	6
Nuclear compilation and evaluation	NA	3	3
Heavy element chemistry	NA	4	4
Isotopic research materials production	NA	10	11
Materials sciences	89	96	109
Chemical sciences	60	64	70
Fundamental interactions	NA	39	44
Processes and techniques	NA	24	26
Engineering, mathematical and geosciences	24	25	31
Engineering research	NA	4	5
Applied mathematical sciences	NA	12	14
Geosciences research	NA	10	12
Advanced energy projects	6	7	8
Biological energy research	7	9	10
Program direction	3	3	3
Energy research analysis	10	3	3
University research support	12	11	5
Advisory and oversight program direction	3	3	3
Policy and management energy research	1	1	(b)

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[a] Program transfer from the National Science Foundation
[b] Less than $500,000.

Fossil energy

The overall R&D budget authority request of $104 million for fossil energy programs in 1983 is $303 million, or 74 percent, less than the 1982 estimate. Fossil energy R&D is being redirected from accelerating the development of short-run technologies and from demonstration activities that promote early commericialization by the private sector to performing more generic and technology base research. Government support for near-term proprietary technologies is deemphasized. Support for environment-related research continues to be supported. While most R&D work at the pilot plant scale would be terminated, operation of existing Government experimental facilities with unique capabilities (coal combustion and liquefaction systems) would be continued in support of generic and technology base R&D or in support of basic research. This funding philosophy applies to the three subprogram areas; continuing funds represent either a winding-down of completed work projects or the maintenance of facilities with unique capabilities whose current short-term capital equipment proves too costly for private investment.

Coal R&D budget authority shows a $271 million, or 76 percent, decrease to $88 million in 1983 with reductions in all programs. Large decreases are proposed in advanced research and technology development, coal liquefaction, combustion systems, and surface coal gasification. The magnetohydrodynamics program will be terminated.

Petroleum R&D budget authority is proposed at $16 million, or $23 million less than 1982, a 58-percent decrease.

Gas R&D programs are terminated by 1983, compared with $9 million in budget authority in 1982.

R&D budget authority for fossil energy
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$650	$407	$104
Coal	564	359	88
Coal technology and coal preparation	40	24	9
Advanced research and technology development	51	52	17
Coal liquefaction	184	98	26
Combustion systems	37	31	7
Fuel cells	32	34	10
Heat engines and heat recovery	29	15	-
Underground coal gasification	10	8	1
Magnetohydrodynamics	67	22	-
Mining R&D	33	11	1
Surface coal gasification	70	53	11
Program direction	11	12	8
Petroleum	55	39	16
Advanced process technology	6	4	3
Enhanced oil recovery	16	15	6
Oil shale	32	18	6
Program direction	1	2	1
Gas	31	9	-
Unconventional gas recovery	30	9	-
Program direction	(a)	(a)	-

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[a] Less than $500,000.

Energy conservation

The Federal R&D energy conservation program shows a redefined focus in 1983, with a $64 million, or 77-percent, reduction from 1982 to a total of $19 million. Research will focus on expanding the Nation's scientific knowledge base by supporting generic technology base projects and more fundamental research activities. The administration's energy policy considers that each sector of the economy has strong financial incentives to develop and demonstrate technologies that appear technically and economically promising.

In 1983, all conservation activities appear in a single program for the first time. The terminal technology development programs -- buildings and community systems, industrial conservation, and transportation conservation -- are being phased out in 1982. Remaining activities are included in a new program called energy conservation research.

In the past, multi-sector programs had been composed of three subprograms: energy conversion and utilization technologies (ECUT), appropriate technology, and energy-related inventions work. Now ERTA is seeking $19 million only for the ECUT subprogram and program direction necessary for ECUT and for closing out the conservation program. Program direction funding also covers close-out of the electric energy systems and energy storage programs.

R&D budget authority for energy conservation
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$197	$84	$19
Buildings and community systems	42	33	-
Building systems	NA	19	-
Residential conservation service	NA	-	-
Community systems	NA	4	-
Urban waste	NA	5	-
Small business	NA	-	-
Technology and consumer products	NA	-	-
Appliance standards	NA	2	-
Analysis and technology transfer	NA	1	-
Federal Emergency management program	NA	(a)	-
Program direction	NA	3	-
Industrial	43	9	-
Waste energy reduction	15	2	-
Industrial process efficiency	14	3	-
Industrial cogeneration	8	-	-
Implementation and deployment	3	2	-
Program direction	3	2	-
Transportation	92	34	-
Vehicle propulsion technology development	47	11	-
Electric and hybrid vehicle RDT&E	34	16	-
Transportation systems utilization	5	1	-
Alternative fuel utilization	4	4	-
Program direction	3	1	-
Energy conservation research	21	8	19
Energy conservation and utilization technology	8	-	18
Appropriate technology	6	3	-
Inventors programs	6	5	-
Program direction	1	(a)	2

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[a] Less than $500,000.

Uranium enrichment

The 1983 R&D budget authority request for uranium enrichment activities is $104 million, or $52 million (33 percent), less than 1982. The uranium enrichment activities program is designed to meet domestic, foreign, and U.S Government requirements for uranium enrichment services at an economically attractive price. As a result of economic analyses, it was determined that a 3-percent, or $3 million reduction, was consistent with this policy.

The advanced isotope separation program, by contrast, is scheduled for a 62-percent, or $49 million, reduction in 1983. The goal of this program is to develop a technology that will provide for the production of enriched uranium at a significantly reduced cost. This technology, if successful, could be used to replace the power-intensive gaseous diffusion plants. The reduction reflects completion of a major data package associated with the base science and technology development effort.

Uranium resource assessment R&D activity was cancelled in the 1982 budget revision.

R&D budget authority for uranium enrichment
[Dollars in millions]

	1981 actual	1982 estimate	1983 estimate
Total	$131	$156	$104
Uranium enrichment activities	64	76	73
Uranium resource assessment	4	-	-
Advanced isotope separation technology ..	64	80	30

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[a] Less than $500,000.

Nuclear Regulatory Commission

R&D budget authority for the NRC Office of Nuclear Regulatory Research is expected to decrease $3 million, or 1 percent in 1983 to a total of $220 million. A basic objective of the NRC programs is to provide objectively verified safety and analytical methods which meet the needs of licensing the Clinch River breeder reactor project, other regulatory activities, and public confidence.

Most research safety programs are proposed for increases except for the LOFT (loss-of-fluid test) experimental program, which shows a $27 million, or 64 percent decrease, and the LOCA (loss-of-coolant accidents) and transient research program, which shows a decline of $1 million, or 3 percent, in 1983.

A $6 million, or 73 percent, increase for the advanced reactors safety program would support research on gas-cooled reactors as well as the fast breeder reactor licensing at Clinch River. Accident evaluation and mitigation research is increased by $14 million, or 43 percent, to provide NRC with the technical bases required to mitigate the consequences of severe accidents.

R&D budget authority for the Nuclear Regulatory Commission
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$227	$223	$220
LOCA (loss-of-coolant accidents) and transient research	46	31	30
LOFT (loss-of-fluid test)	42	42	15
Accident evaluation and mitigation ...	26	33	47
Advanced reactors	10	8	13
Reactor and facility engineering	28	34	38
Facility operations and safeguards ...	13	13	14
Waste management	10	12	14
Siting and environment	13	9	9
Systems and reliability analysis	14	15	16
Program technical support	26	26	25

Environmental Protection Agency

The energy R&D program under EPA is expected to decrease by $18 million, or 34 percent, to $35 million in 1983. This overall cut was applied to all remaining 1982 programs with the elimination of those programs that are not consistent with the administration's energy policy of allowing the marketplace to determine the economic value of environmental issues.

The multi-media energy program received the smallest cut -- 3 percent -- and will continue to address those energy-source problems that have the potential to adversely affect the environment, such as acid rain.

A cut of $9 million, or 87 percent, in the oxidants energy program reflects curtailment of the fundamental combustion modification program as well as assessment of health and ecological effects of ozone and other photochemical oxidants.

The gases and particles energy program is proposed for a decrease of $3 million, or 28 percent. Emphasis will continue on activities that directly support EPA regulatory development and implementation. The cut represents the completion of evaluation of conventional fabric filter technologies.

R&D budget authority for the energy R&D program of the
Environmental Protection Agency
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$104	$52	$35
Multi-media energy program	41	25	24
Oxidants energy	13	11	1
Gases and particles energy	20	12	9
Hazardous air pollutants energy	5	-	-
Water quality energy	12	3	-
Drinking water energy	2	-	-
Industrial waste water energy	3	1	-
Solid waste energy	1	-	-
Chemical testing and assessment technology	6	-	-
Municipal spills	1	1	-

GENERAL SCIENCE

This function consists of National Science Foundation (NSF) programs and three programs of the Energy Research and Technology Administration (ERTA) proposed as part of the Department of Commerce. The programs that fall within this function are viewed as contributing to the Nation's scientific base in an even broader sense than the basic research that supports agency missions.

R&D budget authority for 1983 totals $1,509 million, an increase of 9 percent over the 1982 level of $1,387. The key elements of the 1983 general science function are as follows:

- An increase of 7 percent above the 1982 level for NSF programs, to a total of $1,025 million in 1983.
- An increase in NSF basic research of 7 percent to $976 million in 1983.
- An increase of $17 million in NSF mathematical and physical sciences programs, or 6 percent above the 1982 level.
- An increase of $20 million in NSF astronomical, atmospheric, earth, and ocean sciences programs, or 8 percent above the 1982 levels.
- An increase of $10 million in NSF biological, behavioral and social sciences programs, or 5 percent above 1982.
- An increase of $7 million in engineering research, or 7 percent over 1982.
- A $6 million, or 30-percent, drop in NSF ocean drilling programs.
- An increase in ERTA programs of 13 percent over 1982 to a total of $484 million, including a 23-percent increase for high energy physics.

R&D budget authority for general science as a share of total budget authority for this function is 90 percent in the 1983 budget. Virtually all of the activities within the general science function are research or development with the remainder consisting of R&D plant and some NSF information activities. Of the R&D total, 95 percent consists of basic research.

R&D budget authority for general science
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$1,340	$1,387	$1,509
National Science Foundation	944	958	1,025
Mathematical and physical sciences	256	272	289
Astronomical, atmospheric, earth and ocean sciences	239	244	264
Biological, behavioral and social sciences	191	183	193
Engineering	89	95	102
U.S. Antarctic program	61	64	81
Scientific, technological, and international affairs	56	44	47
Science and engineering education	14	2	(a)
Ocean drilling programs	22	20	14
Special foreign currency program	4	4	2
Program development and management	28	32	33
Adjustments for deferrals and carryovers	-18	-1	-
Energy Research and Technology Administration (Commerce)	396	429	484
High energy physics	249	269	331
Nuclear physics	104	112	113
Life sciences research and nuclear medicine applications	41	45	37
General science program direction	2	2	2

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[a] Less than $500,000.

National Science Foundation

The mathematical and physical sciences (MPS) proposed research funding level in 1983 is 6 percent, or $17 million, higher than in 1982. The 1983 R&D budget request shows continued support across the full spectrum of MPS disciplines. Computer research, up 9 percent, is expected to further the development of experimental research capability in universities and colleges. The needs of the basic physical sciences--physics, chemistry, and materials research--receive almost the same relative emphases in the R&D budget request, although increases of 8 percent and 9 percent are requested for chemistry and materials research and no increase is requested for physics.

R&D budget authority for mathematical and physical sciences
[Dollars in millions]

	1981 actual	1982 estimate	1983 estimate
Total	$256	$272	$289
Mathematical sciences	28	31	34
Computer research	20	22	24
Physics[a]	75	79	79
Chemistry	58	61	66
Materials research	71	74	81
Program development and management	5	6	6

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[a] Data for 1983 includes support for the Michigan State University Phase II heavy ion cyclotron transferred to NSF from DOE in 1983. Data for 1981 and 1982 include support for the Stanford Synchrotron Radiation Facility, which was transferred to DOE in 1983.

The astronomical, atmospheric, earth, and ocean sciences (AAEO) activity shows an increase of 8 percent, or $20 million, in 1983 budget authority. A 7-percent, or $4 million, growth is planned for the astronomical sciences. Astronomy project support, up $1 million, will emphasize the study of comets, in preparation for the return of Comet Halley in 1985-86, and of the chemical composition of clusters and galaxies; instrumentation at submillimeter wavelengths; and data analysis computers and solid state detectors for optical and infrared wavelength regions. An increase of $3 million is proposed to meet higher operating costs at the National Astronomy Centers.

An increase of 7 percent, or $5 million, in atmospheric sciences gives priority to climate modeling, atmospheric chemistry studies, and precipitation in cyclonic storms. An increase of almost $4 million is indicated for atmospheric sciences project support and an increase of almost $3 million for the National Center for Atmospheric Research. Each of these increases is 9 percent over 1982.

The earth sciences program shows the largest relative gain over 1982 for AAEO programs -- 18 percent, or $5 million. This would provide increased emphasis on research on the structure, physical, and chemical evolution of the U.S. continental crust in addition to research on the fundamental nature of earthquakes, seismic profiling, support of new instrumentation in geochemistry and geophysics, and research on the geology, geochemistry, and petrology of ore deposits.

An increase of 7 percent, or $5 million, for ocean sciences activities would provide increased funding for ocean sciences research support (up $3 million) and oceanographic facilities and support (up $2 million). All aspects of ocean sciences research are supported.

R&D budget authority for astronomical, atmospheric, earth, and ocean sciences
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$239	$244	$264
Astronomical sciences	58	59	63
Astronomy project support	19	20	21
National Astronomy and Ionosphere Center	5	5	6
Kitt Peak National Observatory and Cerro-Tololo Inter-American Observatory	17	17	18
National Radio Astronomy Observatory	14	15	16
Sacramento Peak Observatory	2	2	2
Atmospheric sciences	67	68	73
Atmospheric sciences project support	38	38	42
National Center for Atmospheric Research	27	28	31
National Scientific Balloon Facility	2	2	-
Earth sciences	28	29	34
Ocean sciences	75	76	81
Ocean sciences research	48	47	50
Oceanographic facilities and support	27	29	31
Arctic research program	6	6	6
Program development and management	5	6	6

R&D budget authority for the biological, behavioral, and social sciences (BBS) program activities shows a proposed increase of 5 percent, or $10 million in 1983. The physiology, cellular, and molecular biology program shows the largest relative and absolute gain, 8 percent, or $6 million, in 1983. This would cover support for instrumentation for shared use of researchers in cellular physiology and molecular and genetic sciences. Environmental biology activities are scheduled to increase 7 percent, or $3 million, which would allow some increases in the size and duration of awards for research on large, integrated ecosystems projects. While behavioral and neural sciences funding would increase by 5 percent, or $2 million, levels of support in anthropology and cognitive science would remain the same. Virtually no increase is shown in project support in the social and economic sciences.

R&D budget authority for biological, behavioral, and social sciences
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$191	$183	$193
Physiology, cellular and molecular biology	78	79	85
Environmental biology	41	42	45
Behavioral and neural sciences	35	32	34
Social and economic sciences	25	18	18
Information science and technology	6	5	5
Program development and management	6	7	7

The engineering program shows increased support of 7 percent, or $7 million, in 1983. Increases in research in microelectronics, critical chemical processes, and innovative production systems continue to drive the program's budget request. Accordingly, electrical, computer, and systems engineering is proposed to increase 12 percent, or $3 million; chemical and process engineering, 10 percent, or $2 million, including establishment of the first phase of a fluidization research facility; civil and environmental engineering, 7 percent, or $2 million, and mechanical engineering and applied mechanics, 12 percent, or $2 million.

R&D budget authority for engineering
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$ 89	$ 95	$102
Electrical, computer and systems engineering	23	25	28
Chemical and process engineering	18	20	22
Civil and environmental engineering[a] ...	28	28	30
Mechanical engineering and applied mechanics	16	17	19
Interdisciplinary research	-	(b)	(b)
Program development and management	4	4	4

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[a] Data for 1981 and 1982 include support for the Strong Ground Motion Instrumentation Project, which is expected to be transferred to the U.S. Geological Survey in 1983.
[b] Less than $500,000

The U.S. Antarctic program is proposed to increase 27 percent, or $17 million, in 1983. The increase is directed almost entirely to operations support. The research program shows a gain of 13 percent, or $1 million, with chief growth in glaciology, earth resources, and oceanography. The gain in the operations support program is 29 percent, or $16 million, of which $13 million is for reimbursement of the Department of Transportation for full operating costs of Coast Guard icebreakers.

R&D budget authority for U.S. Antarctic program
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$ 61	$ 64	$ 81
U.S. Antarctic research program	9	8	9
Operations support program[a]	52	56	72

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[a] Data for 1983 include funding for icebreaker support not previously the responsibility of NSF.

Research activities within scientific, technological and international affairs (STIA) show an increase of 7 percent, or $3 million, in 1983. The largest program -- industrial science and technological innovation -- is 17 percent, or $2 million, higher in 1983 than in 1982. Emphasis in this activity is on industry/university cooperative research, including support to university cooperative research centers. The small business innovation research program is the next largest activity within the broader program, and funding remains the same.

The international cooperative scientific activities program is scheduled for a 10-percent decrease, or $1 million, largely the effect of elimination of support for the International Institute for Applied Systems Analysis. This decrease is not offset by increases for scientific cooperation with Europe and Latin America.

A new activity, coordinated agencywide research activities, is expected to increase 38 percent, or $3 million. One function of this program is to support broader research participation by the performing community, especially by women and minorities, and the increase reflects efforts toward that goal.

R&D budget authority for scientific, technological, and international affairs
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$ 56	$ 44	$ 47
Industrial science and technological innovation	17	12	14
International cooperative scientific activities	10	10	9
Intergovernmental and public services science and technology	(a)	(a)	(a)
Policy research and analysis	4	4	4
Science resources studies	1	1	1
Coordinated agencywide research activities[b]	16	8	11
Program development and management	8	8	8

[a] Less than $500,000

[b] This is a new subactivity containing programs previously under NSF cross-directorate programs, in addition to similar activities funded elsewhere in NSF, plus one new subactivity.

The ocean drilling programs are expected to decrease 30 percent, or $6 million in 1983. The change reflects the termination of advanced ocean drilling activities in 1983, a program that entered the planning phase in 1982. Engineering studies for Explorer conversion would be completed and the information gained transferred to redirect the deep sea drilling project.

The 7 percent, or $1 million, reduction in the deep sea drilling project reflects the phaseout of personnel-intensive support activities, such as engineering development, in preparation for elimination of the Glomar Challenger deep sea drilling program in 1984. Scientific operations and direct support activities continue, however.

R&D budget authority for ocean drilling programs
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$ 22	$ 20	$ 14
Deep sea drilling project	17	15	14
Ocean margin drilling program	5	-	-
Advanced ocean drilling	-	6	-

Energy Research and Technology Administration

General science programs of the proposed Energy Research and Technology Administration (ERTA) as part of the Department of Commerce are scheduled for growth of 13 percent, or $55 million in 1983, reaching a total of $484 million.

High energy physics, the largest activity in the ERTA general science program, would advance 23 percent from 1982 to 1983, reaching $331 million. Physics research would increase 12 percent and facility operations, 25 percent. A major feature of the 1983 program is shakedown and initial operation of the Energy Saver Superconducting Synchrotron at Fermilab. Priority is also given to operation and research utilization of the Positron Electron Project (PEP) at the Stanford Linear Accelerator (SLAC). High energy physics technology would grow 35 percent, with much of the increase accounted for by the Tevatron I and Tevatron II projects at Fermilab, new detector and beam line development at Brookhaven and development of the linear collider concept at SLAC.

Nuclear physics, proposed for growth of $1 million in 1983 for total R&D budget authority of $113 million, emphasizes study of the interactions, properties, and structures of atomic nuclei and nuclear matter at the most fundamental level possible.

Life sciences research and nuclear medicine applications received reduced support in the 1983 budget. R&D budget authority for this program would fall from $45 million in 1982 to $37 million in 1983. The general life sciences activity supports a long-term research effort that provides the information, concepts, theories, and models needed to develop a biological basis for understanding and estimating energy-related risks to human health. The nuclear medicine applications activity primarily supports research and development into new application of radiation and radio isotopes for the diagnosis and treatment of human disease and the transfer of nuclear technology to clinical medicine.

R&D budget authority for the general science programs of the Energy Research and Technology Administration (Commerce)

/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$396	$429	$484
High energy physics	249	269	331
Physics research	75	83	93
Facility operations	116	126	157
High energy physics technology	59	60	81
Nuclear physics	104	112	113
Medium energy nuclear physics	46	51	53
Heavy ion nuclear physics	39	42	40
Low energy nuclear physics	12	12	12
Nuclear theory	7	8	8
Life sciences research and nuclear medicine applications	41	45	37
General life sciences	24	26	19
Nuclear medicine applications	17	19	19
General science program direction	2	2	2

Basic Research: All Functions

The President's budget provides for real growth in budget authority for basic research in 1983 with a proposed increase of $509 million, or almost 10 percent. All major functions show substantial gains ahead of anticipated inflation except for health, which shows a 3-percent increase, and natural resources and environment, which shows a 9-percent decrease.

The general science function, which accounts for one-fourth of all Federal basic research, is scheduled for an increase of $122 million in 1983, or 9 percent. NSF programs are expected to increase 7 percent overall while ERTA (Commerce) basic research is scheduled for almost 14-percent growth, almost entirely in high energy physics.

The health function continues to lead in basic research support, accounting for more than one-third of the Federal basic research total in 1983. Funding for basic research in health is expected to increase $67 million or only 3 percent over the 1982 level -- significantly below anticipated inflation. More than 90 percent of the research in health is sponsored by the National Institutes of Health (HHS).

National defense reflects the largest absolute and relative increases of any function in 1983 -- $146 million, or 21 percent. Basic research within this function is expected to account for 14 percent of the Federal basic research total. Growth is derived from increases within the DOD technology base mission area.

The space research and technology function is expected to increase $91 million, or 19 percent in basic research budget authority, second only to national defense in relative growth. Most of this effort is in NASA space sciences programs relating to physics and astronomy and planetary exploration.

The agriculture function shows a proposed increase of $31 million, or 10 percent. Most of this growth is for basic research programs of the Agricultural Research Service (USDA).

The energy function is scheduled for a $37 million basic research increase in 1983, or 16 percent. This provides for growth in the ERTA (Commerce) basic energy sciences program.

Natural resources and environment is the only major function to show a decrease in 1983 -- $11 million, or 9 percent. The basic research programs of the Geological Survey (Interior) and the Forest Service (USDA) are each expected to decrease $3 million in 1983. These two agencies account for three-fourths of the total for this function. An additional $3 million cut results from the elimination of the Office of Water Research and Technology (Interior).

Budget authority for basic research by function
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$5,107	$5,346	$5,855
General science	1,256	1,318	1,439
National Science Foundation	879	910	976
Energy Research and Technology Administration (Commerce)	377	408	463
All other functions	3,851	4,029	4,416
Health	1,951	1,999	2,066
National defense	610	683	828
Space research and technology	445	482	573
Agriculture	281	292	323
Energy	220	239	276
Natural resources and environment	131	123	112
Transportation	89	99	111
Education, training, employment and social services	66	60	68
Commerce and housing credit	17	19	22
Veterans benefits and services	15	13	14
International affairs	12	9	10
Community and regional development	5	6	6
Administration of justice	5	4	4
General government	3	3	4
Income security	3	(a)	(a)

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[a] Less than $500,000

The transportation function, which is primarily made up of the NASA aeronautical basic research program, is scheduled for a 12-percent increase in 1983.

The remaining functions account for only 2 percent of all Federal basic research budget authority in the 1981-83 period.

TRANSPORTATION

The budget authority request for transportation R&D activites in 1983 is $831 million, 11 percent greater than the 1982 level. This function is made up of the subdivisions of the Department of Transportation (DOT) and the aeronautical research and technology program of the National Aeronautics and Space Administration (NASA). The chief changes in R&D support in 1983 are as follows:

- An increase of 12 percent, to $111 million, in budget authority for basic research, represented by the NASA aeronautical program.
- An increase of 13 percent in air transportation programs, mostly in Federal Aviation Administration support.
- An increase of 17 percent in water transportation programs as a result of growth in Maritime Administration R&D support.

R&D budget authority for transportation as a share of total budget authority for this function is an estimated 4 percent in the 1983 budget.

R&D budget authority for transportation
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$869	$748	$831
Ground transportation	211	166	166
Federal Highway Administration (DOT)	43	37	43
National Highway Traffic Safety Administration (DOT)	61	55	59
Federal Railroad Administration (DOT)	41	23	20
Urban Mass Transportation Adm.	66	51	44
Air transportation	598	545	618
Federal Aviation Adm. (DOT)	116	94	152
Air traffic control	65	47	55
Advanced computer	-	11	47
Navigation	11	8	5
Aviation weather	7	5	8
Aviation medicine	3	3	3
Aircraft safety	11	5	13
Environment	3	1	2
Operations development	15	15	18
Aeronautical research and technology (NASA)	482	451	466
Research and technology base	134	163	182
Aerodynamics	24	29	42
Propulsion	32	37	43
Materials and structures	18	24	31
Aircraft controls and guidance	5	7	13
Human factors	6	8	10
Multidisciplinary	5	6	4
General aviation	7	8	-
Low speed aircraft	10	11	12
High speed aircraft	21	26	27
Transport aircraft	7	8	-
Systems technology programs	138	71	50
Materials and structures	9	7	-
Propulsion	4	1	-
Avionics and flight control	1	1	-
Aeronautical systems studies	3	-	-
General aviation	1	-	-
Low speed aircraft	24	26	30
High speed aircraft	17	8	20
Transport aircraft	33	13	-
Advanced propulsion	46	15	-
Research and program management	210	218	234
Water transportation	40	28	33
Maritime Administration (DOT)	15	10	18
Coast Guard (DOT)	25	18	15
Other transportation	20	10	14
Office of the Secretary (DOT)	10	3	8
Research and Special Programs Administration (DOT)	11	6	6

BEST DOCUMENT AVAILABLE

Ground transportation programs remain virtually unchanged in overall funding levels with a total request of $166 million shown for 1983. Increases in highway and highway traffic safety research are offset by decreases in railroad and urban mass transportation R&D programs.

In 1983, air transportation R&D support is expected to increase $73 million over 1982, to $618 million. The Federal Aviation Administration (DOT) accounts for $58 million of the increase, with the additional funds used to continue engineering and development of air traffic control systems, advanced computer development, and aircraft safety research.

The NASA aeronautical research and technology program is scheduled for a 3-percent increase, to $466 million, with the increase in research and technology base offsetting a large decrease in the systems technology program. Aeronautical systems technology programs in 1983 will consist only of high speed and low speed aircraft programs, which have strong direct interdependence with aeronautical research programs of DOD. All other programs are discontinued. This deemphasis of demonstration projects under the broad systems technology program reflects an administration objective of reducing the Federal role in areas that directly support industry for product development. Increased support for aeronautical research and technology base programs will cover the application of new computational methods and high speed computer architectures to practical aeronautical problems. All fundamental aeronautical research performed by NASA will be budgeted under research and technology base programs.

Water transportation R&D activities are expected to increase $5 million, or 17 percent. Maritime Administration (DOT) 1983 R&D budget authority will increase $8 million, or which $5 million will fund operations of U.S. Coast Guard ice breaking vessels in support of navigation research in the Arctic, and $3 million will support research efforts in the areas of advanced ship development and advanced ship operations. These increases are partially offset by a $3 million decrease in Coast Guard (DOT) programs.

NATURAL RESOURCES AND ENVIRONMENT

R&D budget authority for natural resources and environment shows a decrease in 1983 of $133 million, 14 percent below the 1982 level. Major aspects of the proposed $819 million program for 1983 are as follows:

- A decrease of 9 percent to $112 million in 1983 from 1982 for basic research.
- A 17-percent decrease in water resources programs, reflecting termination of the Office of Water Research and Technology.
- A 10-percent decrease in conservation and land management programs, resulting from a $15 million reduction in 1983 for the Forest Service.
- A reduction of $57 million for the pollution control and abatement programs of the Environmental Protection Agency (EPA).
- A $30 million reduction in support for the National Oceanic and Atmospheric Administration (NOAA), resulting in a 1983 R&D total 17 percent lower than in 1982.

R&D budget authority for natural resources and environment as a share of total Federal budget authority for this function is estimated at 10 percent in 1983.

R&D budget authority for natural resources and environment
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$1,061	$952	$819
Water resources	64	55	46
Bureau of Reclamation (Int)	16	11	10
Office of Water Research and Technology (Int)	18	11	-
Corps of Engineers (DOD)	30	33	36
Conservation and land management	135	130	117
Forest Service (USDA)	128	127	112
Bureau of Land Management (Int)	2	3	3
Office of Surface Mining and Reclamation (Int)	6	1	2
Recreational resources	103	106	104
Fish and Wildlife Service (Int)	95	96	93
National Park Service (Int)	8	10	11
Pollution control and abatement	271	230	173
Environmental Protection Agency	271	230	173
Other natural resources	488	432	379
National Oceanic and Atmospheric Administration (Commerce)	219	182	152
Geological Survey (Int)	170	158	149
Bureau of Mines (Int)	97	92	78
Office of the Secretary (Int)	1	-	-

Water resources

The budget request for water resources R&D activities in 1983 is $46 million, a decrease of 17 percent from the 1982 level. The reduction is chiefly caused by the elimination of the Office of Water Research and Technology (Interior). Programs of the Bureau of Reclamation (Interior) and the Army Corps of Engineers are expected to change relatively little.

Conservation and land management

At $117 million, the 1983 R&D budget authority for this subfunction is 10 percent lower than the 1982 level. The Forest Service (USDA) accounts for almost the entire activity; the programs of this agency are scheduled to decrease $14 million, or 11 percent from 1982 -- $5 million for land and resource protection research, $7 million for renewable resources management, and $2 million for general administration.

R&D budget authority for the Forest Service (USDA)
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$128	$127	$112
Land and resource protection research	50	49	44
Fire and atmospheric research	7	9	7
Forest insects and disease	21	21	20
Renewable resources evaluation	13	13	11
Renewable resources economics research	5	5	4
Surface environment and mining	2	2	1
Renewable resources management and utilization programs	58	61	54
Trees and timber management research	21	20	18
Forest watershed management research	9	9	8
Wildlife, range, and fish habitat research	8	9	8
Forest recreation research	2	2	2
Forest products utilization research	16	17	15
Forest engineering research	3	3	3
General administration	19	16	15

Recreational resources

The 1983 budget request for R&D efforts within recreational resources is $104 million, down $2 million from 1982. The U.S. Fish and Wildlife Service (Interior), which conducts 90 percent of the R&D activities within this subfunction, is expected to receive approximately the same level of support as in 1982 -- $93 million. Resource management activities support, which includes in-house research on habitat preservation, wild animal control, fishery stock maintenance, and endangered species, would decrease 24 percent in 1983 from 1982 -- from $51 million to $38 million. Federal aid funds to support State conducted research activities on fish and wildlife restoration would increase $6 million, or 36 percent, for fish restoration and $4 million, or 14 percent, for wildlife restoration.

The National Park Service (Interior) R&D budget authority request is $1 million more than in 1982, to $11 million, supporting continued research programs in archeology and social sciences.

R&D budget authority for the Fish and Wildlife Service (Interior)
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$95	$96	$93
Resource management	50	51	38
Habitat preservation	23	23	15
Wildlife resources	13	14	13
Fishery resources	11	11	8
Endangered species	3	3	2
Federal aid, fish restoration	18	17	23
Federal aid, wildlife restoration	28	28	32

Pollution control and abatement

All programs under this subfunction are conducted by EPA. The 1983 proposed R&D budget authority of $173 million is $57 million, or 25 percent, lower than the 1982 budget. The decrease results primarily from completion of several research efforts in water quality, drinking water, and toxic substances, as well as from efficiencies in scheduling research and reductions in areas that are not cost-effective. Major program emphasis continues on acid rain and ground water protection activities as well as on developing a scientific basis for hazardous waste regulations, toxic chemical review, and evaluation of the environmental and public health impacts from the use of pesticides.

The air quality research program would be reduced from 1982 levels by $8 million, to $47 million, in 1983. Research would be directed to evaluation and establishment of national ambiant air quality standards, and emission standards for industrial, municiple, and mobile pollution. Health effects research and environmental processes and effects research would continue, although at reduced levels.

Water quality research would receive the largest decrease of the EPA non-energy R&D programs, from $45 million in 1982 to $27 million in 1983 -- a 39-percent decrease. Municiple wastewater programs more appropriately conducted by the private engineering community, such as design engineering, are being eliminated, as is all extramural research, which will be shifted to in-house R&D laboratories.

A 33-percent decrease in drinking water research support is a net figure, resulting from increased support for high-priority projects that is more than offset by a decrease for lower-priority activities. Research delays include data evaluation on the incidence and health effects of contaminants; evaluation of alternative disinfectant techniques; and a national quality assurance program. Efforts to protect subsurface waters, a high-priority activity, would be expanded.

Hazardous waste research efforts in 1983 would be almost level with 1982, $30 million. While completion of several oil spills projects and of the fuel extraction program has resulted in a decreased need for funding, a shift of emphasis towards more in-house research efforts would require added resources, resulting in a net $1 million increase in 1983 over the 1982 level.

The $4 million reduction in toxic substances research is generally spread over all research projects, which support development of more effective techniques, models, and data bases to predict health effects of new chemicals.

Abatement, control and compliance programs are expected to decrease by $12 million from 1983, reflecting lessened support for contracts, grants, and cooperative agreements for these activities.

R&D budget authority for the Environmental Protection Agency[a]
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total[a]	$271	$230	$173
Programs funded by the EPA R&D and S&E appropriations[a]	237	206	166
Air quality	67	55	47
Environmental processes and effects	19	19	14
Scientific assessment	3	2	3
Technical information and liaison	1	1	1
Monitoring systems and quality assurance	14	13	12
Health effects	27	18	15
Environmental engineering and technology	3	3	2
Water quality	55	45	27
Scientific assessment	2	1	1
Technical support	1	1	1
Monitoring systems and quality assurance	11	7	5
Health effects	6	6	4
Environmental processes and effects	11	10	7
Chesapeake Bay	4	-	-
Great Lakes	4	2	-
Environmental engineering and technology	17	18	10
Drinking water	25	28	19
Hazardous waste	34	29	30
Pesticides	8	5	6
Radiation	2	3	2
Interdisciplinary	7	6	4
Exploratory research core program	6	6	4
Minority institution research support	1	-	-
National environmental workforce	(b)	-	-
Toxic substances	35	31	27
Scientific assessment	(b)	(b)	(b)
Technical information and liaison	(b)	(b)	(b)
Monitoring systems and quality assurance	3	5	6
Health effects	11	10	9
Environmental engineering and technology	1	2	1
Environmental processes and effects	13	10	9
Stratospheric modification	2	1	1
National Center for Toxicological Research	4	2	1
Monitoring and technology support	(b)	-	-
Management and support	4	4	4
Program funded under the abatement control and compliance appropriation	30	14	2
Hazardous substance response trust fund	3	10	5

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[a] Excludes energy-related R&D programs.
[b] Less than $500,000.

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The hazardous substance response trust fund is funded at $5 million below the 1982 level, reflecting more the high startup costs to implement Superfund than a reduction in planned activity and the fact that much of the information needed for developing guidelines, protocols, and the required cleanup and safety manuals will be completed in 1982.

Other natural resources

All agencies in this group receive reduced R&D funding under the proposed 1983 budget so that, as a group, the requested budget authority is $53 million, or 12 percent, less than in 1982 for a total of $379 million.

The National Oceanic and Atmospheric Administration (Commerce) decrease of $30 million, to $152 million, reflects termination of the Sea Grants, weather modification research, and American fisheries products research programs, as well as reduced support for ocean fisheries, marine ecosystems analysis, marine technology activities, international projects, and specialized environmental services. Basic environmental services, however, are expected to increase $7 million; other programs are scheduled for increases of $1 or $2 million, or none.

R&D activities at the Geological Survey (Interior) are expected to decrease by $9 million, to $149 million, in 1983. Of the decrease $6 million would be spread among programs under the geologic and mineral resources survey and mapping activity.

The Bureau of Mines (Interior) 1983 request shows a $14 million decrease, reflecting reduced support of minerals health safety technology and minerals environmental technology.

R&D activities of the Office of the Secretary (Interior) are proposed for transfer to the Bureau of Mines in 1982.

R&D budget authority for the National Oceanic and Atmospheric Admin. (Commerce)
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$219	$182	$152
Mapping, charting, and surveying services..	8	7	8
Ocean fisheries and living marine resources	69	60	54
Marine ecosystems analysis	17	14	11
Marine technology	13	12	8
Sea grants	26	17	-
Basic environmental services	26	24	31
Earth satellite service	7	6	7
Public forecast and warning services	15	15	17
Specialized environmental services	8	7	5
Global monitoring of climate changes	4	4	4
Weather modification	9	5	-
International projects	9	5	3
Executive direction and administration	7	4	4
American fisheries products research	3	2	-

R&D budget authority for the Geological Survey (Interior)
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$170	$158	$149
Topographic surveys and mapping	8	8	6
Research on mapping technology	3	4	4
Research on land use mapping techniques and analysis	1	1	1
Research related to the airborne positioning system	3	3	2
Geologic and mineral resources surveys and mapping	114	112	106
Earthquake hazards reduction	24	24	23
Other geologic hazards	16	14	11
Geologic framework	11	12	12
Geomagnetism	2	2	2
Climate	1	1	1
Mineral resources investigations	24	25	27
Coal resources	8	8	8
Onshore oil and gas and oil shale research investigations	6	6	5
Uranium/thorium research investigations	4	4	1
Geothermal research investigations	5	4	3
World energy resource assessment	1	1	-
Offshore geologic surveys	12	12	12
Water resources investigations	30	25	26
Conservation of lands and minerals	7	7	7
Earth sciences applications	8	4	4
Exploration of national petroleum reserves in Alaska	4	2	-
Digital cartography	-	-	1

AGRICULTURE

Within this function all activity is conducted by the Department of Agriculture (USDA). Total R&D budget authority requested for agriculture is expected to increase $46 million, or 7 percent, to $740 million in 1983. This plan reflects a policy of support to research essential to the Nation's agricultural and consumer needs and not likely to be otherwise funded. Areas of concern in 1983 include the following:

- An increase of 40 percent over 1982, to $23 million in competitive research grants.
- An increase of 14 percent, to $91 million, in animal production research.
- An increase of 9 percent, to $182 million, in plant production research.
- An increase of 17 percent, to $64 million, in research on use and improvement of soil, water, and air.
- An increase of 10 percent, or $2 million, for the human nutrition research program with emphasis on the nutrient needs of people of different ages and using different methods to detect malnutrition.

R&D budget authority for agriculture as a share of total budget authority for this function is 11 percent in 1983, compared with 7 percent in 1982.

R&D budget authority for agriculture
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$659	$694	$740
Agricultural Research Service (USDA)	402	412	454
Animal production	76	80	91
Animal production efficiency research	76	79	90
Research on housing	1	1	1
Plant production	157	167	182
Plant production efficiency research	155	163	182
Tropical/subtropical agricultural research	2	4	-
Use and improvement of soil, water, and air	54	55	64
Research on conservation and use of land and water resources and maintaining environmental quality	40	41	47
Research on watershed development	13	14	17
Processing, storage, distribution, food safety, and consumer services research	84	85	90
Processing, storage, and distribution efficiency research	56	58	60
Research to expand agricultural exports	2	2	2
Research to improve human health and safety	24	25	26
Research on consumer services	1	1	1
Human nutrition research	31	25	28
Cooperative State Research Serv. (USDA)	201	221	223
Payments under the Hatch Act	128	141	144
Cooperative forestry research	11	12	11
Payments to 1890 colleges and Tuskegee Institute	19	21	22
Special research grants	18	23	23
Competitive research grants	16	16	23
Plant science	13	13	20
Human nutrition	3	3	3
Animal health and disease research	7	6	-
Administration	2	1	1
Economic Research Service (USDA)	40	39	40
Statistical Reporting Service (USDA)	8	7	8
Office of International Cooperation and Development (USDA)	5	1	3
Agricultural Marketing Service (USDA)	1	2	-
Office of Transportation (USDA)	1	1	1
Agricultural Cooperative Service (USDA)	2	2	1
Human Nutrition Information Service (USDA)	-	9	8

Agricultural Research Service

A net increase of $42 million, or 10 percent, to a total of $454 million is proposed for the Agricultural Research Service. Research covers mission-oriented programs to ensure an abundance of high-quality, nutritious, reasonably priced food and other agricultural products to meet domestic and world needs while maintaining environmental quality.

A proposed $11 million, or 14-percent, increase in animal production research covers efforts to enable livestock producers to improve the efficiency of producing high-quality animal products.

An increase of $15 million, or 9 percent, in plant production research will continue emphasis on basic research in crop production and protection. It will include research on basic anatomy, physiochemistry, and the physiological functions of plant cells to improve crop productivity of the three major exports -- soybeans, corn, and wheat.

A proposed $9 million, or 17 percent, increase in soil, water, and air research reflects expanded support for identifying and overcoming environmental factors such as acid rain on crop yields. An additional $4 million, or 19 percent, in 1983 will be used on water shed development activities to study the effects of soil erosion on soil productivity.

An increase of $5 million, or 5 percent, in processing, storage, distribution, food safety, and consumer services research will emphasize the basic research to provide more complete understanding of the fundamental biological processes in agricultural products and commodities that are the key to improving food quality and safety.

Research on human nutrition is expected to increase $2 million, or 10 percent in 1983. Emphasis is placed on the special nutrient needs of infants, young children, and the elderly. Research will be conducted on nutrient content of foods, biological processes that influence availability, and interactions among nutrients and other dietary components.

Cooperative State Research Service

The 1983 budget contains a proposed increase of $2 million, or 1 percent, to $223 million for the Cooperative State Research Service program. The most significant increase, $7 million, or 40 percent, is proposed for the competitive research grants program, within which the largest increase, 48 percent, is directed to plant science and a slight increase, 4 percent, to human nutrition research.

Funding for special research grants is expected to diminish by $1 million, or 2 percent, in 1983, representing completion of several projects. These grants will be awarded on a discretionary basis to institutions designated by USDA and university advisory groups to improve the research capability for solving food and agricultural problems. Nearly $3 million will be awarded to projects concerning tropical and subtropical environments and productivity factors in 1983.

An increase of $4 million, or 2 percent is proposed for payments under the Hatch Act. This increase in funding will provide for a portion of the increased operating costs in the State agricultural experiment stations and will assist these stations to maintain strong base programs across a broad spectrum of high-priority research areas.

Partially offsetting decreases result from the proposed termination of the animal health and disease research program, which can be continued by the States as part of their ongoing programs if they so desire; and a nearly $1 million decrease for Cooperative State Research Service administration costs.

INTERNATIONAL AFFAIRS

R&D budget authority within the international affairs function is requested at $194 million in 1983, $30 million higher than the 1982 figure of $164 million. Virtually all of the support provided in this functional area is from the Agency for International Development (AID). Typically, AID research and development funds emphasize agriculture, rural development and nutrition, population planning, and health.

R&D budget authority is 1 percent of total budget authority for this function in 1983.

R&D budget authority for international affairs
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$160	$164	$194
Agency for International Development	156	161	186
Arms Control and Disarmament Agency	2	2	6
Department of State	1	2	1

EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES

R&D budget authority for this function, at $189 million in 1983, shows a decline of $11 million, or 5 percent, from the 1982 level.

Research and general education aids programs account for 67 percent of the 1983 proposed R&D funding for this function. The proposed Foundation for Education Assistance would encompass a number of programs of the Department of Education, with a $76 million budget in 1983 for the R&D components of those programs. In the R&D area a $5 million increase for handicapped research would be partially offset by decreased support for vocational and adult education and bilingual education programs. Smithsonian Institution research and education programs are expected to increase by $6 million in 1983.

Training and employment, formerly a major subcategory of the R&D total within this function, reflects no funding in 1983. All programs are conducted by the Department of Labor. Authorization under the Comprehensive Employment and Training Act (CETA) will expire at the end of fiscal year 1982, and 1983 funding for this program and the Office of Youth Programs is uncertain. Proposed legislation would replace this and most other Labor employment and training programs with block grants to the States.

Social services research and development account for 31 percent of the R&D total for education, training, employment, and social services in 1983. All programs within this subcategory are conducted by the Department of Health and Human Services (HHS) Human Development Services agency. Support is expected to increase slightly in 1983, largely because social services discretionary activities are planned to pick up some programs formerly under child welfare and child abuse within the Administration for Children, Youth, and Families and other programs within the Administration on Aging.

R&D budget authority for this function as a share of total budget authority is an estimated 1 percent in the 1983 budget.

R&D budget authority for education, training, employment, and social services
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$298	$200	$189
Research and general education aids	136	119	127
Foundation for Education Assistance	91	74	76
National Institute of Education	66	53	54
Handicapped Research: Innovation and Development	10	5	10
Vocational and adult education	5	5	3
Bilingual education	6	6	5
National Center for Education Statistics	3	2	2
Education Analysis Centers	(a)	(a)	(a)
Cooperative education	(a)	-	-
National diffusion program	1	2	2
Smithsonian Institution	45	45	51
Training and employment	85	21	-
Employment and Training Adm. (Labor)	85	21	-
Youth programs	66	6	-
Comprehensive Employment and Training Act (CETA)	14	9	-
Work incentive program	1	1	-
Unemployment insurance program	(a)	-	-
Positive adjustment assistance	4	4	-
Other labor services	7	3	3
Labor Management Services Administration (Labor)	3	1	1
Employment Standards Administration (Labor)	3	1	1
Departmental management (Labor)	1	1	1
Social services	70	56	59
Human Development Services (HHS)	70	56	59
Administration for Children, Youth, and Families	31	26	5
Head Start	10	10	5
Child welfare R&D	11	11	-
Child abuse	10	6	1
Administration on Aging	4	1	1
Administration for Native Americans	2	1	(a)
Social services research	4	-	-
Social services discretionary activities	-	-	27
Rehabilitation Services: National Institute of Handicapped Research	30	29	27

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[a] Less than $500,000

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ALL OTHER FUNCTIONS

The six remaining functions represent areas in which R&D activities play a relatively small part. The following tables, presented in descending order of 1983 R&D budget authority by function, identify the R&D programs and program areas of the agencies whose activities fall within the functions. Together the R&D budget authority for these six functions amounts to $364 million in 1983, a 6-percent decrease from 1982.

Changes in 1983 for these functions are as follows:

- o An increase of 7 percent, or $9 million, to $140 million, for veterans benefits and services with most funding devoted to medical research.
- o A 14-percent, or $15 million, decrease to $92 million, for commerce and housing credit, including a $9 million decrease in National Bureau of Standards (Commerce) R&D programs.
- o A decrease of $18 million, or 29 percent, to $45 million for community and regional development R&D programs.
- o A 17-percent, or $6 million, increase to $41 million for income security R&D programs.
- o A decrease of $4 million, or 14 percent, to $24 million for administration of justice R&D programs.
- o A decrease of $1 million, or 4 percent, to $22 million for general government.

For individual functions the highest share of R&D programs within the total is 3 percent for commerce and housing credit. For each of the others the individual R&D share is a fraction of 1 percent.

The share of R&D budget authority within total budget authority for all these functions together is slightly more than one-tenth of 1 percent in 1983.

R&D budget authority for veterans benefits and services
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$143	$131	$140
Veterans Administration	143	131	140
Medical research	128	118	127
Investigator-initiated studies	98	91	99
Cooperative studies	11	10	11
Career development	13	11	12
High priority research	6	6	5
Agent orange studies	(a)	(a)	1
Rehabilitative R&D	9	7	8
Health services R&D	3	3	3
Program direction	3	2	2

[a] Less than $500,000.

R&D budget authority for commerce and housing credit
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$106	$107	$92
National Bureau of Standards (Commerce)	81	86	77
Measurement research and standards	37	39	36
Engineering measurements and standards	24	26	31
Computer sciences and technology	10	10	-
Central technical support	10	11	10
National Oceanic and Atmospheric Administration (Commerce): Research pertaining to American fisheries	3	2	-
National Telecommunications and Information Administration (Commerce)	11	10	7
Bureau of the Census (Commerce)	3	4	4
Federal Communications Commission	3	1	1
Patent and Trademark Office (Commerce)	1	1	1
Federal Trade Commission	3	4	4

R&D budget authority for community and regional development
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$104	$63	$45
Department of Housing and Urban Development	38	19	20
Housing programs	6	2	2
Community and urban development	5	3	3
Local government management	3	2	2
Housing markets	18	8	9
Fair housing	(a)	1	(a)
Safety and standards	4	1	2
Research support	2	2	1
Economic Development Administration (Commerce)	28	8	-
Tennessee Valley Authority	31	33	26
Federal Emergency Management Agency	7	4	-

[a] Less than $500,000.

R&D budget authority for income security
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$43	$35	$41
Social Security Administration (HHS)	23	21	25
Departmental Management (HHS)	20	13	15
Pension Benefit Guaranty Corporation (Labor)	1	1	1

R&D budget authority for administration of justice
/Dollars in millions/

	1981 actual	1982 estimate	1983 estimate
Total	$34	$28	$24
Office of Justice Assistance Research and Statistics (Justice)	22	18	15
Federal Prison System (Justice)	4	2	2
Customs Service (Treasury)	3	2	1
General Administration (Justice)	1	1	1
Drug Enforcement Administration (Justice)	1	2	2
Immigration and Naturalization Service (Justice)	1	1	(a)
Federal Bureau of Investigation (Justice)	1	2	1
Bureau of Alcohol, Tobacco, and Firearms (Treasury)	(a)	-	-
Office of Protective Research (Treasury)	1	(a)	-

[a] Less than $500,000.

R&D budget authority for general government
/Dollars in millions/

	1980 actual	1982 estimate	1983 estimate
Total	$22	$23	$22
Office of Personnel Management	8	6	5
Library of Congress	5	5	5
Bureau of Engraving and Printing (Treasury)	3	4	2
Internal Revenue Service (Treasury)	5	6	8
Advisory Commission on Intergovernmental Relations	2	2	2

END

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